

CLAIMS

What is claimed is:

1. A paper feeding apparatus comprising a pick-up roller disposed within the smallest document width of a plurality of transportable document sizes, wherein a standard of position adjustment of documents is located at one side of an area in which the documents are stacked, and faces in an orthogonal direction against a document transporting direction.

2. The paper feeding apparatus according to claim 1 further including a separate roller disposed in the downstream of the pick-up roller such that the separate roller is located within said smallest document width.

3. The paper feeding apparatus according to claim 2 further including a first feed roller disposed in the downstream of the separate roller such that a distance between the standard and a center of the first feed roller in terms of the orthogonal direction against the document transporting direction is longer than a distance between the standard and a center of the separate roller in terms of the orthogonal direction against the document transporting direction.

4. The paper feeding apparatus according to claim 1 further including:

a document feeding tray for stacking the documents to be picked and fed by the pick-up roller;

a fixed guide disposed as the standard of the position adjustment;
and

a movable guide which is movable and disposed so as to face the fixed guide.

5. The paper feeding apparatus according to claim 3 further including:

a document feeding tray for stacking the documents to be picked and fed by the pick-up roller;

a fixed guide disposed for the standard of the position adjustment; and

a movable guide which is movable and disposed so as to face the fixed guide.

6. The paper feeding apparatus according to claim 4 wherein the fixed guide extends in the document transporting direction to the proximity of a back end of the document feeding tray.

7. The paper feeding apparatus according to claim 1 wherein the pick-up roller includes at least two rollers.

8. The paper feeding apparatus according to claim 5 wherein the pick-up roller includes at least two rollers.

9. The paper feeding apparatus according to claim 4 wherein one of or both of the fixed guide and the movable guide includes a warp preventing member(s) formed on an inner wall surface(s) thereof for preventing the documents contacting with the inner wall surface(s) from being warped in a vertical direction.

10. The paper feeding apparatus according to claim 3 wherein the separate roller provided within said smallest document width is located at a position most far away from the standard of the position adjustment within said smallest document width.

11. The paper feeding apparatus according to claim 10 wherein a distance between the standard and a center of the pick-up roller in terms of the orthogonal direction against the document transporting direction is equal to the distance between the standard and the center of the separate roller in terms of the orthogonal direction against the document transporting direction.

12. The paper feeding apparatus according to claim 2 further including a retard roller contacting with the separate roller, wherein when one document is fed between the separate roller and the retard roller by the pick-up roller, the retard roller rotates in a direction of feeding the document toward the downstream in cooperation with the separate roller, and when at least two documents are fed between the separate roller and the retard roller by the pick-up roller, the retard roller reversely rotates in a direction of pushing back the document(s) of a retard roller side.

13. The paper feeding apparatus according to claim 5 further including:

a second feed roller disposed in the downstream of the first feed roller for transporting the document fed by the pick-up roller, the separate roller and the first feed roller toward a document reading unit and transporting the read document toward the downstream of the second feed roller;

a discharging roller disposed in the downstream of the second feed roller for discharging the document; and

a document discharging tray for receiving the document discharged by the discharging roller.

14. The paper feeding apparatus according to claim 13 wherein each of the pick-up roller, the separate roller, the first feed roller, and the second feed roller includes at least two rollers.

15. An automatic image reading apparatus comprising a paper feeding apparatus wherein the paper feeding apparatus includes:

- a document feeding tray for stacking documents;

- a fixed guide disposed as a standard of position adjustment of the documents at one side of the document feeding tray so as to face in an orthogonal direction against a document transporting direction;

- a pick-up roller disposed within the smallest document width of a plurality of transportable document sizes for picking and feeding the documents;

- a separate roller disposed in the downstream of the pick-up roller and located within said smallest document width; and

- a first feed roller disposed in the downstream of the separate roller,

wherein a distance between the fixed guide and a center of the first feed roller in terms of the orthogonal direction against the document transporting direction is longer than a distance between the fixed guide and a center of the separate roller in terms of the orthogonal direction against the document transporting direction.

16. The automatic image reading apparatus according to claim 15 further including a document reading unit, wherein the paper feeding apparatus further includes:

- a retard roller contacting with the separate roller;

- a second feed roller disposed in the downstream of the first feed roller for transporting the document fed by the pick-up roller, the separate roller and the first feed roller toward the document reading unit and transporting the read document to the downstream of the second feed roller;

- a discharging roller disposed in the downstream of the second feed roller for discharging the document; and

- a discharging tray for receiving the document discharged by the discharging roller,

wherein when one document is fed between the separate roller and the retard roller by the pick-up roller, the retard roller rotates in a direction of feeding the document toward the downstream in cooperation

with the separate roller, and when at least two documents are fed between the separate roller and the retard roller by the pick-up roller, the retard roller reversely rotates in a direction of pushing back the document(s) of a retard roller side.

17. A facsimile apparatus comprising a paper feeding apparatus wherein the paper feeding apparatus includes:

- a document feeding tray for stacking documents;

- a fixed guide disposed as a standard of position adjustment of the documents at one side of the document feeding tray so as to face in an orthogonal direction against a document transporting direction;

- a pick-up roller disposed within the smallest document width of a plurality of transportable document sizes for picking and feeding the documents;

- a separate roller disposed in the downstream of the pick-up roller and located within said smallest document width; and

- a first feed roller disposed in the downstream of the separate roller,

wherein a distance between the fixed guide and a center of the first feed roller in terms of the orthogonal direction against the document transporting direction is longer than a distance between the fixed guide and a center of the separate roller in terms of the orthogonal direction against the document transporting direction.

18. The facsimile apparatus according to claim 17 further including a document reading unit, wherein the paper feeding apparatus further includes:

- a retard roller contacting with the separate roller;

- a second feed roller disposed in the downstream of the first feed roller for transporting the document fed by the pick-up roller, the separate roller and the first feed roller toward the document reading unit and transporting the read document to the downstream of the second feed roller;

- a discharging roller disposed in the downstream of the second feed roller for discharging the document; and

a discharging tray for receiving the document discharged by the discharging roller,

wherein when one document is fed between the separate roller and the retard roller by the pick-up roller, the retard roller rotates in a direction of feeding the document toward the downstream in cooperation with the separate roller, and when at least two documents are fed between the separate roller and the retard roller by the pick-up roller, the retard roller reversely rotates in a direction of pushing back the document(s) of a retard roller side.

19. A copying machine comprising a paper feeding apparatus wherein the paper feeding apparatus includes:

a document feeding tray for stacking documents;

a fixed guide disposed as a standard of position adjustment of the documents at one side of the document feeding tray so as to face in an orthogonal direction against a document transporting direction;

a pick-up roller disposed within the smallest document width of a plurality of transportable document sizes for picking and feeding the documents;

a separate roller disposed in the downstream of the pick-up roller and located within said smallest document width; and

a first feed roller disposed in the downstream of the separate roller,

wherein a distance between the fixed guide and a center of the first feed roller in terms of the orthogonal direction against the document transporting direction is longer than a distance between the fixed guide and a center of the separate roller in terms of the orthogonal direction against the document transporting direction.

20. The copying machine according to claim 19 further including a document reading unit, wherein the paper feeding apparatus further includes:

a retard roller contacting with the separate roller;

a second feed roller disposed in the downstream of the first feed roller for transporting the document fed by the pick-up roller, the separate roller and the first feed roller toward the document reading unit and transporting the read document to the downstream of the second feed roller;

a discharging roller disposed in the downstream of the second feed roller for discharging the document; and

a discharging tray for receiving the document discharged by the discharging roller,

wherein when one document is fed between the separate roller and the retard roller by the pick-up roller, the retard roller rotates in a direction of feeding the document toward the downstream in cooperation with the separate roller, and when at least two documents are fed between the separate roller and the retard roller by the pick-up roller, the retard roller reversely rotates in a direction of pushing back the document(s) of a retard roller side.